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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/821,461

04/09/2004

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EXAMINER

LAMPRECHT, JOEL

ART UNIT

PAPER NUMBER

3737

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/821,461	Applicant(s) CHEN ET AL.	
	Examiner JOEL M. LAMPRECHT	Art Unit 3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/23/09 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-5, 7-11 and 15-19, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qin et al (US 2005/0283072) in view of Lin (US 6,068,597) and in further view of Seale (US Re. 34,663). Qin et al disclose a method of characterizing the elasticity of a viscous medium (Claim 27), by directing an ultrasound wave, determining a vibrational velocity, determining a frequency response of the medium and determining an elasticity property as at least partially a function of the resonant frequency (Paragraphs 45-50, 55-58, Claim 13, Paragraphs 97-117). An amplitude modulated, confocal wave is used (Paragraph 37, Fig 1-2), known resonant frequencies are compared to known values (Paragraphs 12-13, 51 and 68, 69), and describes a method using multiple ultrasound sources (Paragraph 41). Qin et al describe sensing vibrational motion with an ultrasound based motion detector, detecting the shear modulus (Paragraph 64, 68 and Claim 21), using a biological tissue (Paragraphs 19-20), varying the focal point across the tissue (Paragraph 39-45), and a processing unit with memory unit to correlate the vibrational data, frequency data, compare that data to known frequencies (Paragraphs 16-21, 47, 73-80).

Qin et al do not disclose the use of the acquisition of a "resonance spectrum" from the plurality of data received during imaging to determine resonant frequency. Attention is then directed to the secondary reference by Lin, which discloses the use of ultrasound imaging for the acquisition of resonant spectrums of an object or target to acquire data from a range of vibrational frequencies to acquire resonant frequency data of tissue for velocity measurement (Figure 1-3, 5, Col 6 Line 18- Col 7 Line 13). The range of frequencies utilized is between 0 and 8 KHz (Clm 2) and amplification of the

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beam is used (Fig 10 1010). It would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated the teachings of Lin in the vibrational velocity methods of Qin et al for the purpose of acquiring diagnostic data about patient-specific medical conditions in the body (Abstract).

Qin et al in view of Lin et al do not disclose modulation of a shear wave beam for acquisition of a shear elasticity or viscosity as a function of the spectrum. Attention is then paid to the teaching reference to Seale which discloses long-standing principles of parallel ultrasound measurements of shear as a function of ultrasound data reflected by body tissues (Col 50 Line 55-Col 51 Line 40), and uses this to acquire and compare to known values (Col 53 Line 50-Col 55 Line 25). Seale also discloses resonant frequency and spectrum analysis through amplitude modulation (Col 16 Line 15 - Col 18 line 35) and disclosure of vector analysis of vibrational response to mechanical loading (Col 20 line 10-45). It would have been obvious to one of ordinary skill in the art that these techniques of mechanical analysis of tissues of the body would be applicable to the disclosures of Qin et al in view of Lin et al for the purpose of ascertaining shear properties of macroscopic tissues view ultrasonography methods (Abstract, Background).

Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qin et al in view of Lin and in further view of Seale as applied to claim 10 above and in further view of Mourad et al (US 6,875,186).

Qin et al in view of Lin and Seale does not disclose differentiating a first type of tissue from a second type of tissue, even though it would be a requirement to know which sort of tissue is being analyzed to specify bone tissue as a target (As well as to diagnose the abnormalities of Seale), does not disclose searching for calcifications, nor characterization as a function of time, though the properties of resonance vibro-acoustography are time and frequency dependent. Attention is then directed to the secondary reference by Mourad et al which teaches the use of a similar system and method for the classification of tissues which are dead, dying, hardening, or undergoing pathological or immune responses. Specifically Mourad et al teach a method of characterizing tissues (Col 13 Line 25 – Col 14 Line 40) as a function of time to determine pathologies including a hardening or density change within tissues (Col 15 Line 15-27). It would have been obvious to one having ordinary skill in the art at the time of the invention to have used the ultrasound tissue classifications disclosed within Mourad et al in the ultrasound tissue property methods of Qin et al in view of Lin and Seale for the purpose of distinguishing tissue properties and classifying tissues differently based on pathologies.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Qin et al in view of Lin and Seale as applied to claim 1 and in further view of Blofgett et al (US 2004/0077949). Qin et al in view of Lin and Seale disclose all that is listed above, but fail to disclose the use of a laser vibrometer for the purpose of sensing the vibrational motion of the medium being studied. Blofgett in the area of ultrasonic tooth structure

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classification disclose a method for sensing vibrational motion with a laser vibrometer (Paragraphs 10-14). It would have been obvious to one having ordinary skill in the art at the time of the invention to have used the laser vibrometer method disclosed by Blofgett et al in the methods taught by Qin et al in view of Lin and Seale as it is a complimentary technique for the remote sensing of ultrasonic waves (Paragraph 12).

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Qin et al in view of Lin and Seale as applied to claim 15 and in further view of Sarvazyan (US 5,606,971). Qin et al in view of Lin and Seale discloses the invention as described including all that is listed above, but fails to disclose the use of a magnetic **resonance elastography** system for the detection of velocity and frequency vibrations. Attention is then directed to the secondary reference by Sarvazyan which discloses in Figure 3 and columns 5 and 6, that both ultrasound systems and MR elastography systems are common and can be used for the classification and diagnosis of tissue properties. It would have been obvious to one having ordinary skill in the art at the time of the invention to have substituted an ultrasound based motion detector as taught by Qin et al in view of Lin and Seale for the MR elastography methods taught by Sarvazyan as they are both capable of detecting shear waves from a source (Col 5 line 60 –Col 6 line 6).

Response to Arguments

Applicant's arguments with respect to claims 1-24 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL M. LAMPRECHT whose telephone number is (571)272-3250. The examiner can normally be reached on 8:30-5:00 Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian L. Casler can be reached on (571) 272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BRIAN CASLER/
Supervisory Patent Examiner, Art
Unit 3737

JML